

IN THE CLAIMS:

1. (Original) A photonic crystal fiber preform comprising:

a rod-shaped substrate with a plurality of holes longitudinally formed therethrough in a photonic lattice structure; and

a plurality of longitudinal material members consisting of solid material, said members having at least two different indices of refraction, the members being ~~inserted~~disposed in the holes, wherein distribution of index of refraction of the photonic crystal fiber preform is controlled by arrangement of the members, and said distribution of index of refraction of the photonic crystal fiber preform is changed by change of said arrangement of the members.
2. (Original) The preform as set forth in claim 1, wherein each of the members is formed in the shape of a rod, the rod being inserted in the corresponding hole.
3. (Original) The preform as set forth in claim 1, wherein each of the holes and members is formed in the shape of a cylinder, the member being inserted in the corresponding hole.
4. (Original) The preform as set forth in claim 1, wherein the index of refraction of the members monotonically decreases from the center of the preform to the outer circumference of the preform.
5. (Original) The preform as set forth in claim 1, wherein the index of refraction of the members monotonically increases from the center of the preform to the outer circumference of the preform.

6. (Original) The preform as set forth in claim 1, wherein the index of refraction of the members monotonically either decreases and then increases or increases and then decreases from the center of the preform to the outer circumference of the preform.

7. (Original) The preform as set forth in claim 1, wherein the substrate is made of a material containing pure silica.

8. (Original) The preform as set forth in claim 1, wherein the substrate is made of a material containing silica and a dopant having a predetermined index of refraction.

9. (Original) The preform as set forth in claim 7, wherein the relative index of refraction of each of the members to pure silica is a predetermined percentage.

10. (Original) A photonic crystal fiber preform comprising:
a cylindrical substrate; and
a plurality of longitudinal material members having at least two different indices of refraction, the members being disposed in the cylindrical substrate in a photonic lattice structure,
wherein distribution of index of refraction of the photonic crystal fiber preform is controlled by arrangement of the members.

11. (Original) The preform as set forth in claim 10, wherein each of the members is formed in the shape of a rod.

12. (Original) The preform as set forth in claim 10, wherein each of the members is formed in the shape of a cylinder having a diameter smaller than that of the cylindrical substrate.

13. (Original) The preform as set forth in claim 10, wherein the index of refraction of the members monotonically decreases from the center of the preform to the outer circumference of the preform.

14. (Original) The preform as set forth in claim 10, wherein the index of refraction of the members monotonically increases from the center of the preform to the outer circumference of the preform.

15. (Original) The preform as set forth in claim 10, wherein the index of refraction of the members monotonically either decreases and then increases or increases and then decreases from the center of the preform to the outer circumference of the preform.

16. (Original) A photonic crystal fiber preform comprising:
an outer cylindrical substrate with a plurality of first holes longitudinally formed therethrough;

an inner rod-shaped substrate fitted in the outer cylindrical substrate, the inner rod-shaped substrate having a plurality of second holes longitudinally formed therethrough, the first and second holes being arranged in a photonic lattice structure; and

a plurality of longitudinal material members consisting of solid material, said members having at least two different indices of refraction, the members being inserted~~disposed~~ in the first and

second holes,

wherein distribution of index of refraction of the photonic crystal fiber preform is controlled by arrangement of the members, and said distribution of index of refraction of the photonic crystal fiber preform is changed by change of said arrangement of the members.

17. (Canceled)

18. (Original) The preform as set forth in claim 16, wherein each of the members is formed in the shape of a rod, the rod being inserted in the corresponding hole.

19. (Original) The preform as set forth in claim 16, wherein each of said substrates has a respective diameter, and wherein each of the members is formed in the shape of a cylinder having a diameter smaller than that of the inner substrate if located within the inner substrate, and otherwise having a diameter smaller than the outer substrate diameter minus the inner substrate diameter.

20. - 37. (Canceled)